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U. S. DEPT. OF AGRICULTURE
BUREAU OF PLANT INDUSTRY
AGRICULTURAL NOTES

PUBLISHED BY

PORTO RICO AGRICULTURAL EXPERIMENT STATION, MAYAGUEZ
OFFICE OF FARM MANAGEMENT, FEDERAL BUILDING, SAN JUAN

No. 35 Page 1.

San Juan, Porto Rico, January, 1927.

SOME PINEAPPLE PROBLEMS.

19th ARTICLE. - SENESCENCE AND REJUVENESCENCE.

By Henry C. Henricksen.

As the carbohydrates and proteins are formed in the leaves and transferred from there to the stalk where they are stored as reserve material for fruit formation, it is self-evident that the first duty of the pineapple grower is to keep his plants growing. A temporary cessation of growth is more harmful to the plant than is indicated by the outward appearance. The pineapple plant does not show wilting for a long time after it has been deprived of water because of the water-storing tissue of the leaves and the very low transpiration, neither does it show the effect of starvation for some time after being deprived of nutrients for it may draw upon the stored-up material in the stalk. Therefore, when normal water and food conditions are restored, the leaves may rejuvenate if the cessation of growth has not been of too long duration; otherwise further growth of the plant will have to come through new leaves or through suckers. This shows senescence to be a relative term which may be applied to the leaves only or to the entire plant.

The loss of water does not carry the leaf beyond the stage of rejuvenescence until it goes well below 80%, that is when the upper layer of water-storing tissue has entirely disappeared and the lower layer has also lost considerable moisture. Sodium, calcium and phosphorus in quantities larger than the normal content produce senescence, the severity of which is very much affected by the time of its duration. That is, growth may be temporarily checked if the plant is obliged to absorb too much of any one of these elements, but if the check is not too severe the leaves may rejuvenate after an application of ammonium sulfate. The unfavorable condition produced by these elements is not due to a clogging of the tissue by any of the salts formed. It seems to be due to the formation of tissue consisting mainly of carbohydrates which do not readily change into such form as will allow for translocation or which actually clog the system and interfere with circulation.

Leaves that are stunted in growth and more or less pale in color because of deflocculated colloidal matter in the soil are affected somewhat differently. They contain gummy materials which seem to interfere with circulation, but they also contain nitrate nitrogen and an abundance of water. They rejuvenate after an application of sulphur and ammonium sulphate which rectify the soil condition and furnish nutrients. This, however, is not always of practical importance for even though the plants may recover it is usually more advantageous to plant fresh vigorous slips after having reconditioned the soil.

When senescence of the leaves has progressed too far growth may be produced from the apex of the stalk in the form of new leaves. If, however, the stalk is also affected, the growth will be from the side of the stalk in the form of suckers. This may take place at any time, showing that age, in the usual sense, is not the cause of it. If it manifests itself when the plant is small there is no remedy for it except a liberal application of ammonium sulphate. Whether the growth at this time results in new leaves or a sucker, is of minor importance for with the extra amount of fertilizer the plant will catch up ^{with} those that are not affected.

When both leaves and stalk of a large plant became senescent to the extent that growth cannot take place except through a sucker, the loss in time is of some importance. In such a case the remedy is a small application of fertilizer in the heart. In these experiments 1/2 oz. to 1 oz. ammonium sulphate or a mixture of that with potassium sulphate produced the desired effect. The heart leaves were burned out and new very vigorous growth started promptly. It did not, in all cases, give favorable results with young plants. But as stated above nothing is gained by using the remedy on them.

Possibly a small application of potassium nitrate on the soil may be useful, but that has not yet been fully demonstrated. The penetrating effect of that salt may be expected to rejuvenate a tissue so dormant that it will not respond to ammonium sulphate.

It is difficult to determine the demarcation between temporary dormancy and permanent senescence. The reaction of the sap, as mentioned in Article No.13, is helpful; as is also a determination of nitrates, according to directions given in Article No.15. Likewise the catalase content gives some information on the subject, as mentioned in Article No.16, but all of these tests fail unless the results are interpreted correlative with the outward appearance of the plant and by one who is well familiar with the different stages of abnormality.

